

琉球大学学術リポジトリ

太平洋域におけるサンゴ礁魚類の多様性

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Session 3: Biodiversity in spatio-temporal scales**Biogeography of the coral reef fishes in the Pacific Ocean**Michel Kulbicki¹, ○René Galzin^{2,3}¹*Institut de Recherche pour le Développement, Université de Perpignan, Perpignan Cedex, France*²*Ecole Pratique des Hautes Etudes, Université de Perpignan, Perpignan Cedex, France*³*Centre de Recherches Insulaires et Observatoire de l'Environnement, Moorea, Polynésie française*

The inshore Pacific fish fauna is the most diversified in the world. It comprises more than 6 000 taxa, i.e. more than a third of all marine fish species. Reef fish species make the bulk of this fauna, with more than 4 100 species. However, much of this fauna is still undescribed or its geographical distribution not well known, with more than 15% of the known taxa still undescribed. Reef fish are represented by 88 families and 686 genera, but 81% of the taxa are found in only 20 families. The diversity of reef fish species is unevenly distributed across the Pacific, with a maximum observed in the Indonesian region, usually referred to the "biodiversity centre" for reef fish. Diversity tends to decrease going eastward from this centre. It is possible to classify reef fish species according to a number of biological and ecological traits. Looking at the trophic structure this fauna is dominated by carnivores, the biggest species tend to be piscivorous and detritus and plankton feeders tend to be smaller than average. Most species are territorial or sedentary, the home range increasing with size. Most species are solitary with an increase in size as school size increases, except for the species which make large schools. Most species are diurnal, the nocturnal species being larger on average. The species composition of reef fish faunas is very homogeneous across the Pacific, with more than 60% similarity between any island and the biodiversity centre. This similarity will decrease with distance to the biodiversity centre. An analysis of 57 checklists indicates that islands may be grouped into 9 biogeographical regions. These regions have a very strong overlap with geological regions which suggests that geological features and history strongly influence the distribution of reef fishes. Endemism of reef fish is generally low. There are however important differences according to regions, with two areas having much higher endemism: the Hawaiian archipelago and the Western Pacific (Japan, Taiwan, China Sea). Isolated islands (Easter Is. and Marquesas) have also a high endemism. On the opposite, Micronesia has a particularly low level of endemism. Endemic species share most of the biological and ecological traits with the other species, except for size. They tend to be smaller than average in the west Pacific and larger than average in the centre Pacific. An analysis of the factors acting on the distribution of reef fish species and their traits indicates that island size and distance to the biodiversity centre are the two most influential ones. There is a strong relationship between diversity at the regional level and the diversity observed on a given reef (local diversity). This relationship is however influenced by a number of large scale and local scale factors. In particular, reef type and fishing effort will affect the observed diversity on a local basis and island size and distance to the biodiversity centre will have a strong influence on the diversity level as well. Observed diversity and abundance or biomass of reef fish are also strongly correlated. In other words, the abundance of reef fishes will depend on both local and regional factors, with different potentials according to the region, the island size and degree of isolation. Local factors play, of course, a very important role, but the consequences are not necessarily identical according to large scale factors, e.g. fishing may influence abundance and community structure in different ways according to the region or/and the island size.